

2000-2001

SEMESTER SYSTEM (SYLLABUS)

M.Sc., Physics, M.Sc., Material Science M.Sc., Space
Physics and M.Sc., (Tech.) Electronics.

(With Effective from 2000 - 2001 Admitted Batch)

I SEMESTER

SSP - S105.

P105. ELECTROMAGNETIC THEORY.

I. INTRODUCTION TO ELECTROSTATICS:

- Coulomb's Law
- Electric Field
- Gauss's law
- Differential form of Gauss's law
- Scalar potential
- Surface distribution of charges and dipoles and discontinuities in the electric field.
- Poisson and Laplace equations
- Green's theorem
- Uniqueness Theorem
- Electrostatic potential Energy and energy density.

CHAPTER 1-1, 2, 3, 4, 5, 6, 7, 8, 9, 11.

II. BOUNDARY VALUE PROBLEMS - I.

- Method of images
- Point charge in the presence of a Grounded conducting sphere
- Conducting sphere in uniform Electric field
- Separation of variables, Laplace equation in Rectangular Co-ordinates.

CHAPTER 2 - 1, 2, 5, 9.

III. BOUNDARY VALUE PROBLEMS - II.

- Laplace equation in spherical co-ordinates.
- Legendre equation and Legendre polynomials.
- Boundary value problems with Azimuthal Symmetry
- Laplace equation in cylindrical co-ordinates, Bessel Functions.

CHAPTER 3-1, 2, 3, 7.

IV. MULTIPOLES, DIELECTRICS

- Multipole expansion
- Multipole expansion of energy of a charge distribution in an external field.
- Boundary value problems with dielectrics
- Molecular polarizability and electric susceptibility

CHAPTER 4-1, 2, 4, 5

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